

REMARKS

Claims 1-21 are pending in the present application.

In the Office Action, claims 1-2, 4-8, 10, 13, 15, 17 and 20-21 were rejected under 35 U.S.C. 102(b) as being anticipated by Mittag et al (U.S. Patent No. 6,477,195). Claims 10, 13-19 and 20-21 were rejected under 35 U.S.C. 102(b) as being anticipated by Pantke et al (U.S. Patent No. 3,634,592). Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Mittag et al (U.S. Patent No. 6,477,195). Claims 3 and 11-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mittag et al in view of Reuter et al (U.S. Patent No. 3,379,426). Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Pantke et al in view of Reuter et al.

Claims 1 and 10 have now been amended. New claims 22-26 have now been added. No new matter has been added. Reconsideration of the application in view of the above amendment and following remarks is respectfully requested.

Information Disclosure Statement

An Information Disclosure Statement is submitted herewith for the Examiner's consideration.

Rejection of Claims 1-2, 4-8, 10, 13, 15, 17 and 20-21 under 35 U.S.C. § 102 based on Mittag

Claims 1-2, 4-8, 10, 13, 15, 17 and 20-21 were rejected under 35 U.S.C. 102(b) as being anticipated by Mittag et al (U.S. Patent No. 6,477,195).

Mittag describes a process for melting down sponge iron where sponge iron 11 in lumpy form as pellets and/or briquets and optionally, partly in the form of fines, is conducted into an electric-arc furnace 1 via chutes or slides 12. When falling onto a slag layer 8 near an electrode 6 inside the electric-arc-furnace, the falling sponge iron 15 forms the shape of a cone envelope. Oxygen for decarburination blown into the reactor 1 by oxygen lances 13 onto the slag layer 8 are

shielded from the electrode 6 by the falling sponge iron 15. See Mittag, paragraphs [0011], [0020], [0021], [0028] and Figs 1-6.

Independent claim 1 of the present application has now been amended so as to recite a method in which a bulk material stream is passed through a dosing orifice to control a material flow rate “so as to maintain at least a portion of the downpipe filled with the bulk material” so that “the bulk material stream enters the furnace essentially undisturbed” so that “the bulk material stream is not substantially enlarged during the fall onto the melt.” Support for this amendment can be found in the Specification, for example, on page 3, lines 6-29, page 5, lines 1-5 and page 7, lines 20-22.

It is respectfully submitted that Mittag fails to describe the feature of maintaining at least a portion of the downpipe filled with the bulk material as now recited in claim 1 of the present invention. Mittag further fails to disclose the features that the bulk material stream enter the furnace essentially undisturbed and that the bulk material stream is not substantially enlarged during the fall onto the melt, as now recited in claim 1. In contrast, Mittag describes that post-combustion lances 13 are specifically arranged to disturb the falling sponge iron jet 15 by blowing oxygen into the falling sponge iron jet 15. See Mittag, paragraphs [0021], [0028] and Figs. 1-6. Mittag describes said arrangement as “essential” to protect the electrodes from direct contact with the oxygen. See Mittag, paragraphs [0008], [0028] and [0021]. Mittag further describes that that the falling sponge iron 15 is substantially enlarged by forming in its periphery a cone envelope when falling. See Mittag, paragraph [0028]. This significant enlargement of the falling sponge iron is also clearly depicted as 15, the falling sponge iron jet, in Figs. 1-6. Mittag also does not disclose that at least a portion of the downpipe is filled with the bulk material as disclosed in claim 1. Moreover, with specific regard to dependent claim 7, Mittag fails to disclose the feature that “after the dosing orifice” the bulk material stream is “passed through a protective tube”. In contrast, the “protective tube” designated by the Examiner on page 3 of the Office Action instead appears to show a funnel-shaped member disposed before chute or slide 12. See Mittag, Fig. 1.

Because Mittag is missing at least the above-recited features of claim 1, it is respectfully submitted that Mittag cannot anticipate claim 1 or any of its dependant claims 2, 4-8, 10, 13, 15, 17 and 20-21.

Reconsideration and withdrawal of the rejection to claims 1-2, 4-8, 10, 13, 15, 17 and 20-21 under 35 U.S.C. § 102(b) based on Mittag is respectfully requested.

Rejection of Claim 9 under 35 U.S.C. § 103

Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Mittag et al (U.S. Patent No. 6,477,195).

Mittag was described above.

Claim 9 properly depends from claim 1. As stated above, Mittag fails to teach at least the features of maintaining at least a portion of the downpipe filled with the bulk material, that the bulk material stream enter the furnace essentially undisturbed and that the bulk material stream is not substantially enlarged during the fall onto the melt. Mittag also does not suggest these features. Therefore, Mittag could not render claim 1 or its dependent claim 9 obvious. Moreover, Mittag does not disclose the feature of introducing metal, metal compounds or mixture of two or more metals or metal compounds into the furnace having a mean grain size of less than 1 mm, as is recited in claim 9. In contrast, Mittag specifically teaches away from using fines by stating that “sponge iron is introduced into the electric-arc furnace in lumpy form, preferably as pellets and/or briquettes, and optionally, partly in the form of fines.” See Mittag, paragraphs [0011] and [0021]. The Applicants submit that the presence of only partly fines would necessarily increase the mean grain size to greater than 1 mm.

For the above reason, reconsideration and withdrawal of the rejection of claim 9 under 35 U.S.C. § 103(a) based on Mittag is respectfully requested.

Rejection of Claims 3 and 11-12 under 35 U.S.C. § 103

Claims 3 and 11-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mittag et al in view of Reuter et al (U.S. Patent No. 3,379,426).

Mittag was described above.

Reuter describes a suction device for removing furnace gasses and ambient air from an electric arc furnace. See Reuter, column 1, lines 15-21 and column 3, lines 39-40.

Claim 3 properly depends from claim 1. As stated above, Mittag fails to teach at least the features of maintaining at least a portion of the downpipe filled with the bulk material, that the bulk material stream enter the furnace essentially undisturbed and that the bulk material stream not be substantially enlarged during the fall onto the melt. Nor does Mittag suggest these features. Reuter does not cure this defect. Therefore, a combination of Mittag with Reuter, to the extent proper, could not render claim 1 or its dependent claim 3 obvious.

Claims 11-12 properly depends from claim 10. It is respectfully submitted that Mittag fails to teach or suggest at least the feature of an adjustable dosing orifice configured to control a flow of the material into the furnace, as recited in claim 10. In contrast, Mittag merely describes a chute or slide. See Mittag, paragraphs [0004] and [0021]. Reuter does not cure this defect. In contrast, Reuter merely describes two different types of shutters 60 and 61 which can be placed onto a nozzle 59 to meter the amount of gas and ambient air sucked into the nozzle from the electric-arc-furnace 1. See Reuter, column 3, lines 39-40, column 4, lines 46-55 and Figs. 12-14. Reuter does not teach an adjustable dosing orifice for supplying (solid) material into an electric-arc-furnace as is recited in claim 10. Therefore, a combination of Mittag with Reuter, to the extent proper, could not render claim 10 or its dependent claims 11-12 obvious.

For the above reason, reconsideration and withdrawal of the rejection of claims 3 and 11-12 under 35 U.S.C. § 103(a) based on Mittag in view of Reuter is respectfully requested.

Rejection of Claims 10, 13-19 and 20-21 under 35 U.S.C. § 102 based on Pantke

Claims 10, 13-19 and 20-21 were rejected under 35 U.S.C. 102(b) as being anticipated by Pantke et al (U.S. Patent No. 3,634,592).

Pantke describes a system for charging sponge iron into an electric arc furnace where a charging arrangement 5, 6 and 10 continuously introduces sponge iron into a furnace 1. The charging arrangement 5, 6 and 10 lead the sponge iron via chutes 11a and 12a to the charging openings/risers 4 which carry funnels 4a at their upper ends. See Pantke, column 4, lines 47-54, column 5, lines 21-24 and Fig. 1.

Independent Claim 10 of the present application has now been amended so as to recite an electric-arc furnace for charging with fine-grained directly reduced iron or ores including "an

adjustable dosing orifice configured to control a flow of the material into the furnace” being provided “at an opening of the downpipe into the furnace. Support for this amendment can be found in the Specification, for example, on page 3, line 6, to page 4, line 3.

It is respectfully submitted that Pantke fails to describe the feature of providing an adjustable dosing orifice configured to control a flow of the material into the furnace at an opening of the downpipe into the furnace, as now recited in claim 10. In contrast, at the opening of the downpipe, Pantke merely describes charging openings/risers 4 which carry funnels 4a at their upper ends. See Pantke, column 4, lines 49-50 and Fig. 1. Moreover, the charging arrangement 5, 6 and 10 in Pantke is not located at the opening of the downpipe into the furnace; it is located above the funnels 4a. See Pantke, column 4, lines 44-54 and Fig. 1.

Because Pantke is missing at least the above-recited feature of claim 10, it is respectfully submitted that Pantke cannot anticipate claim 10 or its dependant claims 13-19 and 20-21.

Reconsideration and withdrawal of the rejection to claims 10, 13-19 and 20-21 under 35 U.S.C. § 102(b) based on Pantke is respectfully requested.

Rejection of Claim 11 under 35 U.S.C. § 103

Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Pantke et al in view of Reuter et al.

Pantke and Reuter were described above.

Claim 11 properly depends from claim 10. As stated above, Pantke fails to teach at least the feature of an an adjustable dosing orifice configured to control a flow of the material into the furnace as recited in claim 10. Nor does Pantke suggest this feature. For the reasons set forth above relative to the rejection of claims 11-12 under 35 U.S.C. § 103(a), Reuter does not cure this defect. Therefore, a combination of Pantke with Reuter, to the extent proper, could not render claim 10 or its dependent claim 11 obvious.

For the above reason, reconsideration and withdrawal of the rejection of claim 11 under 35 U.S.C. § 103(a) based on Pantke in view of Reuter is respectfully requested.

New Claims 22-26

New claims 22-26 have now been added. Support for the new claims can be found in the Specification, for example, for new claim 22 on page 3, lines 26-29; for new claim 23 on page 3, lines 22-29; for new claim 24, on page 11, lines 17-18; for new claim 25 on page 3, lines 31 to 33; and for new claim 26, on page 1 line 33 to page 4 line 4.

It is respectfully submitted that the new claims are patentable over the cited references for at least the same reasons as independent claim 1 is.

CONCLUSION

In view of the above amendment, applicants believes the pending application is in condition for allowance.

It is believed that no fee other than the fee for a one (1) month extension of time is required for these submissions. Should the U.S. Patent and Trademark Office determine that additional fees are owed or that any refund is owed for this application, the Commissioner is hereby authorized and requested to charge the required fee(s) and/or credit the refund(s) owed to our Deposit Account No. 04-0100.

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Respectfully submitted,

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